

WHAT IS CLAIMED IS:

1. An engine exhaust gas purification device, comprising:

a filter which traps particulate matter contained in the exhaust gas from an engine;

a differential pressure detection sensor which detects a differential pressure of the filter;

a sensor which detects an engine running state; and

a microcomputer programmed to:

compute an estimated ash amount ASH_a of the filter based on the detected differential pressure;

compute an engine oil consumption amount OC_{total} based on the detected engine running state;

compute an ash density DENS_{ASH} from the oil consumption amount OC_{total} and estimated ash amount ASH_a; and

compute an ash amount ASH of the filter based on the oil consumption amount OC_{total} and ash density DENS_{ASH}.

2. The engine exhaust gas purification device as defined in Claim 1, further comprising a regeneration device which burns particulate matter trapped by the filter.

3. The engine exhaust gas purification device as defined in Claim 1, wherein the microcomputer is provided with a map which gives an ash amount relative to an engine exhaust gas flow rate and the filter differential pressure, and is programmed to:

compute the engine exhaust gas flow rate based on the detected engine running state; and

compute the estimated ash amount ASH_a by looking up the map from the computed exhaust gas flow rate and detected filter differential pressure.

4. The engine exhaust gas purification device as defined in Claim 2, wherein the microcomputer performs regeneration control of the filter, and the microcomputer is programmed to:

compute an exhaust gas flow rate in a vicinity of the filter based on the engine running state;

determine whether or not the filter has completely regenerated;

determine whether or not the computed exhaust gas flow rate is larger than a predetermined flow rate; and

compute the estimated ash amount ASH_a if the filter has completely regenerated and the exhaust gas flow rate in the vicinity of the filter is larger than the predetermined value.

5. The exhaust gas purification device as defined in Claim 1, wherein the sensor which detects an engine running state comprises a sensor which detects engine load and a sensor which detects engine rotation speed,

and wherein the microcomputer is provided with a map which gives an oil consumption amount relative to engine load and engine rotation speed, and is programmed to:

compute the oil consumption amount OC_total by looking up the map from the detected engine load and the detected engine rotation speed; and

compute the ash amount from the oil consumption amount OC_total and ash density DENS_ASH in the engine oil.

6. The exhaust gas purification device as defined in Claim 1, wherein the microcomputer is programmed to:

compute an average increase rate of the estimated ash amount relative to the oil consumption amount, and set the ash density DENS_ASH to the

average increase rate.

7. The exhaust gas purification device as defined in Claim 1, wherein the oil consumption amount is represented by a vehicle running distance or engine running time.

8. An engine exhaust gas purification device, comprising:

- means for trapping particulate matter contained in the exhaust gas from an engine;

- means for detecting a differential pressure of the filter;

- means for detecting an engine running state;

- means for computing an estimated ash amount ASH_a of the filter based on the detected differential pressure;

- means for computing an engine oil consumption amount OC_{total} based on the detected engine running state;

- means for computing an ash density DENS_{ASH} from the oil consumption amount OC_{total} and estimated ash amount ASH_a; and

- means for computing an ash amount ASH of the filter based on the oil consumption amount OC_{total} and ash density DENS_{ASH}.

9. A computing method for computing an ash amount in the filter, comprising the steps of:

- detecting a differential pressure of a filter;

- detecting an engine running state;

- computing an estimated ash amount ASH_a of the filter based on the detected differential pressure;

- computing an engine oil consumption amount OC_{total} based on the detected engine running state;

- computing an ash density DENS_{ASH} from the oil consumption amount OC_{total} and estimated ash amount ASH_a; and

-15-

computing an ash amount ASH of the filter based on the oil consumption amount OC_total and ash density DENS_ASH.